

From the INTERNATIONAL BUREAU

**PCT**NOTIFICATION CONCERNING  
TRANSMITTAL OF COPY OF INTERNATIONAL  
PRELIMINARY REPORT ON PATENTABILITY  
(CHAPTER I OF THE PATENT COOPERATION  
TREATY)

(PCT Rule 44bis.1(c))

To:

GILL JENNINGS & EVERY  
Broadgate House  
7 Eldon Street  
London EC2M 7LH  
ROYAUME-UNIDate of mailing (*day/month/year*)  
06 July 2006 (06.07.2006)Applicant's or agent's file reference  
HMJ03752WO**IMPORTANT NOTICE**International application No.  
PCT/GB2004/005390International filing date (*day/month/year*)  
22 December 2004 (22.12.2004)Priority date (*day/month/year*)  
23 December 2003 (23.12.2003)

Applicant

SOMANTA LIMITED et al

The International Bureau transmits herewith a copy of the international preliminary report on patentability (Chapter I of the Patent Cooperation Treaty)

The International Bureau of WIPO  
34, chemin des Colombettes  
1211 Geneva 20, Switzerland

Authorized officer

Nora Lindner

Facsimile No. +41 22 338 82 70

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# PATENT COOPERATION TREATY

# PCT

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

Applicant's or agent's file reference HMJ03752WO	<b>FOR FURTHER ACTION</b>	See item 4 below
International application No. PCT/GB2004/005390	International filing date ( <i>day/month/year</i> ) 22 December 2004 (22.12.2004)	Priority date ( <i>day/month/year</i> ) 23 December 2003 (23.12.2003)
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237		
Applicant SOMANTA LIMITED		

1.	This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 <i>bis</i> .1(a).																								
2.	This REPORT consists of a total of 6 sheets, including this cover sheet.  In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.																								
3.	<p>This report contains indications relating to the following items:</p> <table style="width: 100%;"> <tr> <td style="width: 10%; text-align: center;"><input checked="" type="checkbox"/></td> <td style="width: 30%;">Box No. I</td> <td style="width: 60%;">Basis of the report</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td>Box No. II</td> <td>Priority</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td>Box No. III</td> <td>Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td>Box No. IV</td> <td>Lack of unity of invention</td> </tr> <tr> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td>Box No. V</td> <td>Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td>Box No. VI</td> <td>Certain documents cited</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td>Box No. VII</td> <td>Certain defects in the international application</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td>Box No. VIII</td> <td>Certain observations on the international application</td> </tr> </table>	<input checked="" type="checkbox"/>	Box No. I	Basis of the report	<input type="checkbox"/>	Box No. II	Priority	<input type="checkbox"/>	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability	<input type="checkbox"/>	Box No. IV	Lack of unity of invention	<input checked="" type="checkbox"/>	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement	<input type="checkbox"/>	Box No. VI	Certain documents cited	<input type="checkbox"/>	Box No. VII	Certain defects in the international application	<input type="checkbox"/>	Box No. VIII	Certain observations on the international application
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<input type="checkbox"/>	Box No. VIII	Certain observations on the international application																							
4.	The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis .2).																								

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland  Facsimile No. +41 22 338 82 70	<table style="width: 100%;"> <tr> <td style="width: 50%;">Date of issuance of this report 26 June 2006 (26.06.2006)</td> <td style="width: 50%;">Authorized officer  <div style="text-align: center; font-weight: bold;">Nora Lindner</div></td> </tr> <tr> <td colspan="2">e-mail: pt02@wipo.int</td> </tr> </table>	Date of issuance of this report 26 June 2006 (26.06.2006)	Authorized officer  <div style="text-align: center; font-weight: bold;">Nora Lindner</div>	e-mail: pt02@wipo.int	
Date of issuance of this report 26 June 2006 (26.06.2006)	Authorized officer  <div style="text-align: center; font-weight: bold;">Nora Lindner</div>				
e-mail: pt02@wipo.int					

# PATENT COOPERATION TREATY

REC'D 07 APR 2005

WIPO

PCT

From the  
INTERNATIONAL SEARCHING AUTHORITY

PCT

07/07

To:

see form PCT/ISA/220

## WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing

(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference  
see form PCT/ISA/220

### FOR FURTHER ACTION

See paragraph 2 below

International application No.  
PCT/GB2004/005390

International filing date (day/month/year)  
22.12.2004

Priority date (day/month/year)  
23.12.2003

International Patent Classification (IPC) or both national classification and IPC  
C07D207/06, C07D211/22, C07D211/46, C07D207/12, C07D207/08, C07D211/18, C07D211/38, C07D207/10,

Applicant  
SCHOOL OF PHARMACY, UNIVERSITY OF LONDON

### 1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1 (a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

### 2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

### 3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



European Patent Office - P.B. 5818 Patentlaan 2  
NL-2280 HV Rijswijk - Pays Bas  
Tel. +31 70 340 - 2040 Tx: 31 651 epo nl  
Fax: +31 70 340 - 3016

Authorized Officer

Diederer, J

Telephone No. +31 70 340-1097



**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.  
PCT/GB2004/005390

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**Box No. I Basis of the opinion**

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1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.  
☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
  - a. type of material:  
☐ a sequence listing  
☐ table(s) related to the sequence listing
  - b. format of material:  
☐ in written format  
☐ in computer readable form
  - c. time of filing/furnishing:  
☐ contained in the international application as filed.  
☐ filed together with the international application in computer readable form.  
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.  
PCT/GB2004/005390

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**Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

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**1. Statement**

Novelty (N)	Yes: Claims	1-36
	No: Claims	
Inventive step (IS)	Yes: Claims	
	No: Claims	1-36
Industrial applicability (IA)	Yes: Claims	1-36
	No: Claims	

**2. Citations and explanations**

**see separate sheet**

Reference is made to the following documents:

- D1: WO 91/05824 A (NAT RES DEV) 2 May 1991 (1991-05-02)
- D2: COLLIER D A ET AL: "SYNTHESIS, MOLECULAR MODELING, DNA BINDING, AND ANTITUMOR PROPERTIES OF SOME SUBSTITUTED AMIDOANTHRAQUINONES" JOURNAL OF MEDICINAL CHEMISTRY, AMERICAN CHEMICAL SOCIETY. WASHINGTON, US, vol. 31, no. 4, 1988, pages 847-857, XP002063827 ISSN: 0022-2623
- D3: AGBANDJE M ET AL: "ANTHRACENE-9,10-DIONES AS POTENTIAL ANTICANCER AGENTS. SYNTHESIS, DNA-BINDING, AND BIOLOGICAL STUDIES ON A SERIES OF 2,6-DISUBSTITUTED DERIVATIVES" JOURNAL OF MEDICINAL CHEMISTRY, AMERICAN CHEMICAL SOCIETY. WASHINGTON, US, vol. 35, no. 8, 1992, pages 1418-1429, XP002063825 ISSN: 0022-2623

**Re Item V**

**Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1-36 does not involve an inventive step in the sense of Article 33(3) PCT.

Document D1 is considered the closest prior art document. The said document discloses anthraquinone compounds in which the amino alkyl amino substituent is among others cyclic nitrogen containing groups (see claim 1 of D1 in which R' and R'' together are a C2-6 alkylene group which with the nitrogen atom to which R' and R'' are attached forms a heterocyclic group having 3 to 7 atoms).

The difference of this disclosure and the present application is that in the present application, this heterocyclic structure is substituted by at least one X2 or X2 substituted

C1-4 alkyl group, in which X2 is halogen, hydroxyl, C1-6alkoxyl, aryloxy or acyloxy group. The problem to be solved by the applicant was to provide alternative anthraquinone compounds for use in the treatment of cancer.

Documents D2 and D3 disclose amidoanthraquinone compounds, which bear cyclic groups (compounds 4,5,7,8,9 in D2 and compounds 13-16 in D3 bear piperidine groups), of which a few are substituted by CH<sub>2</sub>OH and CH<sub>2</sub>CH<sub>2</sub>-OH groups. The compounds with these substituents show the lowest IC<sub>50</sub> values, showing that these compounds have the highest activities with respect to tumour cell lines. The difference of these compounds with the compounds of the present application is that the compounds of D2 and D3 are anthraquinone compounds, substituted with substituted amido groups, whereas in the present application, the anthraquinone compounds are substituted with at least one substituted amine group.

A skilled person confronted with the problem of providing alternative anthraquinone compounds for use in the treatment of cancer would, starting from D1, use the teaching of D2 and D3 to come to the solution of the present application. He would substitute the heterocyclic group in D1 with a (CH<sub>2</sub>)<sub>1</sub>-2OH group, as he would expect this to have a positive effect on the antitumour activity of the compounds.

It is therefore considered that the subject-matter of claims 1-29 is not inventive with respect to Article 33(3) PCT.

Claims 30-36 concern intermediate compounds and their processes to prepare such compounds. These intermediate compounds are used to prepare the compounds of formula I of claim 1 of the present application. As these compounds are not inventive, the intermediate products cannot be regarded as inventive either. The subject-matter of claims 30-36 is therefore considered not to involve an inventive step according to Article 33(3) PCT.

# PATENT COOPERATION TREATY

**PCT**

## NOTIFICATION OF THE RECORDING OF A CHANGE

(PCT Rule 92bis.1 and  
Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

GILL JENNINGS & EVERY  
Broadgate House  
7 Eldon Street  
London EC2M 7LH  
United Kingdom

<b>Date of mailing</b> (day/month/year) 27 June 2006 (27.06.2006)	<b>IMPORTANT NOTIFICATION</b>
<b>Applicant's or agent's file reference</b> HMJ03752WO	
<b>International application No.</b> PCT/GB2004/005390	<b>International filing date</b> (day/month/year) 22 December 2004 (22.12.2004)

1. The following indications appeared on record concerning:	
<input checked="" type="checkbox"/> the applicant	<input checked="" type="checkbox"/> the inventor
<input type="checkbox"/> the agent	<input type="checkbox"/> the common representative
Name and Address PORS, Klaus School of Pharmacy University of London 29-39 Brunswick Square London WC1N 1AX United Kingdom	State of Nationality DK
	State of Residence GB
	Telephone No.
	Facsimile No.
2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:	
<input type="checkbox"/> the person	<input type="checkbox"/> the name
<input checked="" type="checkbox"/> the address	<input type="checkbox"/> the nationality
<input type="checkbox"/> the residence	
Name and Address PORS, Klaus The Institute of Cancer Therapeutics University of Bradford West Yorkshire BD7 1DP United Kingdom	State of Nationality DK
	State of Residence GB
	Telephone No.
	Facsimile No.
3. Further observations, if necessary:	
4. A copy of this notification has been sent to:	
<input checked="" type="checkbox"/> the receiving Office	<input checked="" type="checkbox"/> the designated Offices concerned
<input type="checkbox"/> the International Searching Authority	<input type="checkbox"/> the elected Offices concerned
<input type="checkbox"/> the International Preliminary Examining Authority	<input type="checkbox"/> other:

<b>The International Bureau of WIPO</b> 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer  Luis HIGUERA
Facsimile No. (41-22) 338.89.65	Telephone No. (41-22) 338 8154



## PATENT COOPERATION TREATY

PCT

NOTIFICATION OF THE RECORDING  
OF A CHANGE(PCT Rule 92bis.1 and  
Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

GILL JENNINGS & EVERY  
Broadgate House  
7 Eldon Street  
London EC2M 7LH  
United Kingdom

<b>Date of mailing</b> (day/month/year) 26 June 2006 (26.06.2006)	<b>IMPORTANT NOTIFICATION</b>
<b>Applicant's or agent's file reference</b> HMJ03752WO	
<b>International application No.</b> PCT/GB2004/005390	<b>International filing date</b> (day/month/year) 22 December 2004 (22.12.2004)

<b>1. The following indications appeared on record concerning:</b> <input checked="" type="checkbox"/> the applicant <input checked="" type="checkbox"/> the inventor <input type="checkbox"/> the agent <input type="checkbox"/> the common representative		
<b>Name and Address</b> PATTERSON, Laurence, Hylton School Of Pharmacy, University Of London 29-39 Brunswick Square London WC1N 1AX United Kingdom	<b>State of Nationality</b> GB	<b>State of Residence</b> GB
	<b>Telephone No.</b>	
	<b>Facsimile No.</b>	
	<b>Teleprinter No.</b>	
<b>2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:</b> <input type="checkbox"/> the person <input type="checkbox"/> the name <input checked="" type="checkbox"/> the address <input type="checkbox"/> the nationality <input type="checkbox"/> the residence		
<b>Name and Address</b> PATTERSON, Laurence, Hylton The Institute of Cancer Therapeutics University of Bradford West Yorkshire BD7 1DP United Kingdom	<b>State of Nationality</b> GB	<b>State of Residence</b> GB
	<b>Telephone No.</b>	
	<b>Facsimile No.</b>	
	<b>Teleprinter No.</b>	
<b>3. Further observations, if necessary:</b>  		
<b>4. A copy of this notification has been sent to:</b> <input checked="" type="checkbox"/> the receiving Office <input checked="" type="checkbox"/> the designated Offices concerned <input type="checkbox"/> the International Searching Authority <input type="checkbox"/> the elected Offices concerned <input type="checkbox"/> the International Preliminary Examining Authority <input type="checkbox"/> other:		

<b>The International Bureau of WIPO</b> 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No. (41-22) 338.89.65	<b>Authorized officer</b>  Luis HIGUERA Telephone No. (41-22) 338 8154
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## PATENT COOPERATION TREATY

PCT

NOTIFICATION OF THE RECORDING  
OF A CHANGE(PCT Rule 92bis.1 and  
Administrative Instructions, Section 422)


From the INTERNATIONAL BUREAU

To:

GILL JENNINGS & EVERY  
Broadgate House  
7 Eldon Street  
London EC2M 7LH  
United Kingdom

<b>Date of mailing</b> (day/month/year) 16 June 2006 (16.06.2006)	<b>IMPORTANT NOTIFICATION</b>
<b>Applicant's or agent's file reference</b> HMJ03752WO	
<b>International application No.</b> PCT/GB2004/005390	<b>International filing date</b> (day/month/year) 22 December 2004 (22.12.2004)

<b>1. The following indications appeared on record concerning:</b> <input checked="" type="checkbox"/> the applicant <input type="checkbox"/> the inventor <input type="checkbox"/> the agent <input type="checkbox"/> the common representative		
<b>Name and Address</b> SCHOOL OF PHARMACY, UNIVERSITY OF LONDON 29-39 Brunswick Square London WC1N 1AX United Kingdom	<b>State of Nationality</b> GB	<b>State of Residence</b> GB
	<b>Telephone No.</b>	
	<b>Facsimile No.</b>	
	<b>Teleprinter No.</b>	
<b>2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:</b> <input checked="" type="checkbox"/> the person <input type="checkbox"/> the name <input type="checkbox"/> the address <input type="checkbox"/> the nationality <input type="checkbox"/> the residence		
<b>Name and Address</b> SOMANTA LIMITED 117 Alexander Park Road London N10 2DP United Kingdom	<b>State of Nationality</b> GB	<b>State of Residence</b> GB
	<b>Telephone No.</b>	
	<b>Facsimile No.</b>	
	<b>Teleprinter No.</b>	
<b>3. Further observations, if necessary:</b>  		
<b>4. A copy of this notification has been sent to:</b> <input checked="" type="checkbox"/> the receiving Office <input checked="" type="checkbox"/> the designated Offices concerned <input type="checkbox"/> the International Searching Authority <input type="checkbox"/> the elected Offices concerned <input type="checkbox"/> the International Preliminary Examining Authority <input type="checkbox"/> other:		

<b>The International Bureau of WIPO</b> 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No. (41-22) 338.89.65	<b>Authorized officer</b>  Anman QIU Telephone No. (41-22) 338 9098
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